No. 633,529. Patented Sept. 19, 1899.

W. B. MOTHERAL.

PADDLE WHEEL.

(Application filed Feb. 18, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

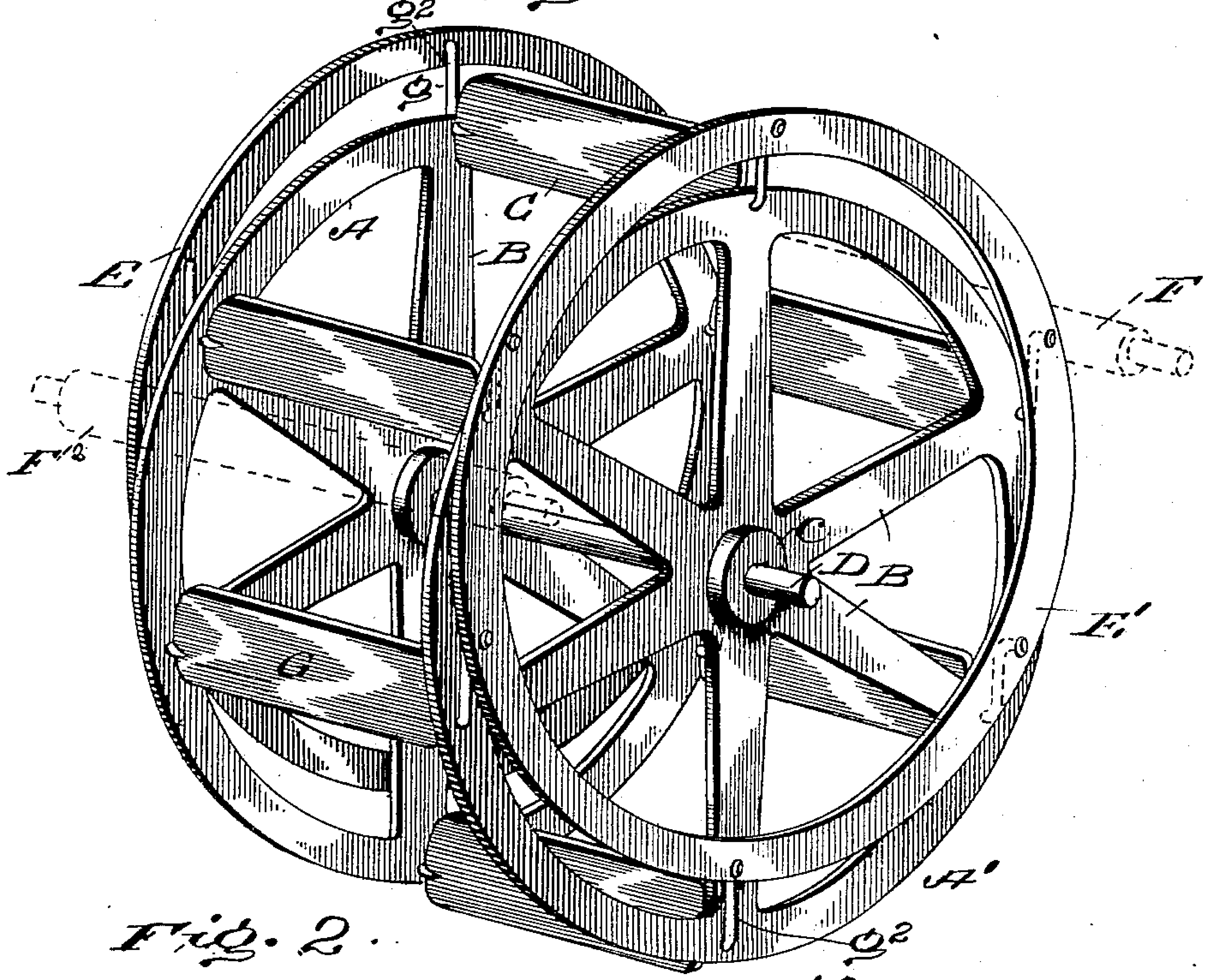
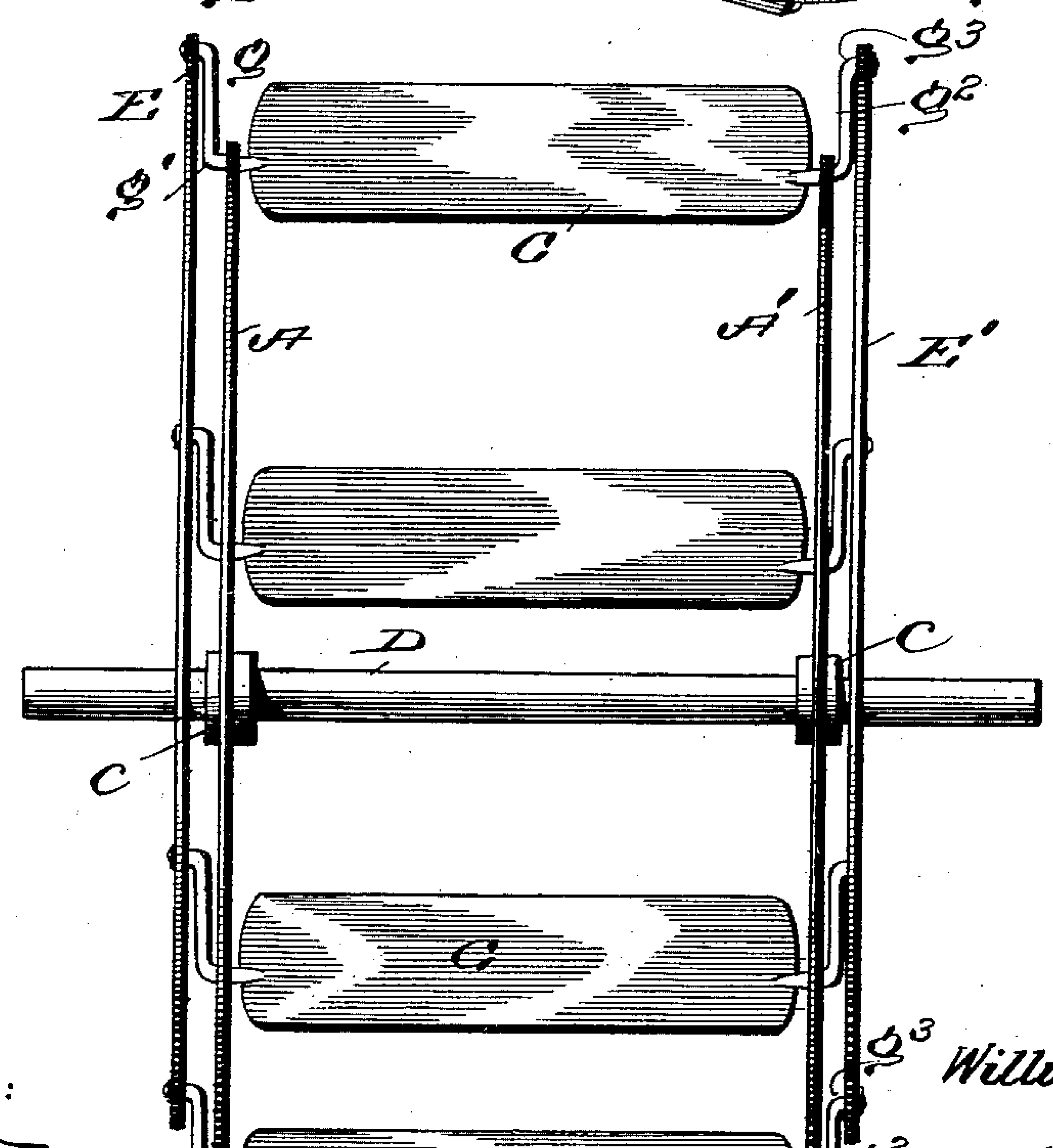


Fig. 2.



Witnesses:
Jno Kruse
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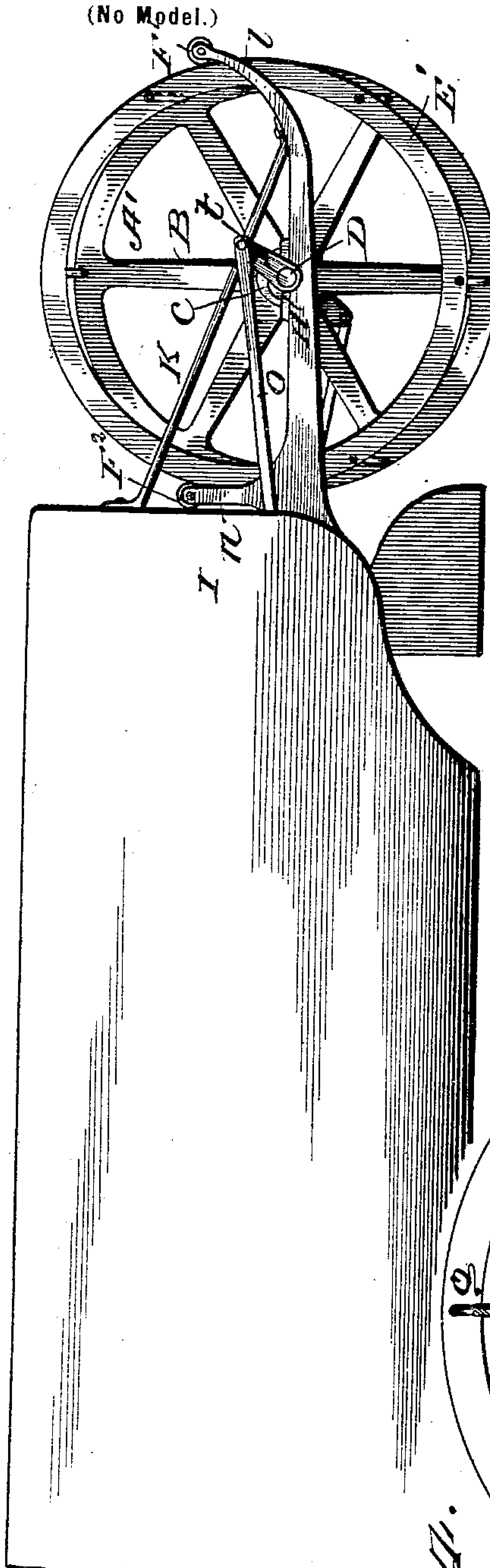

Fig. 3

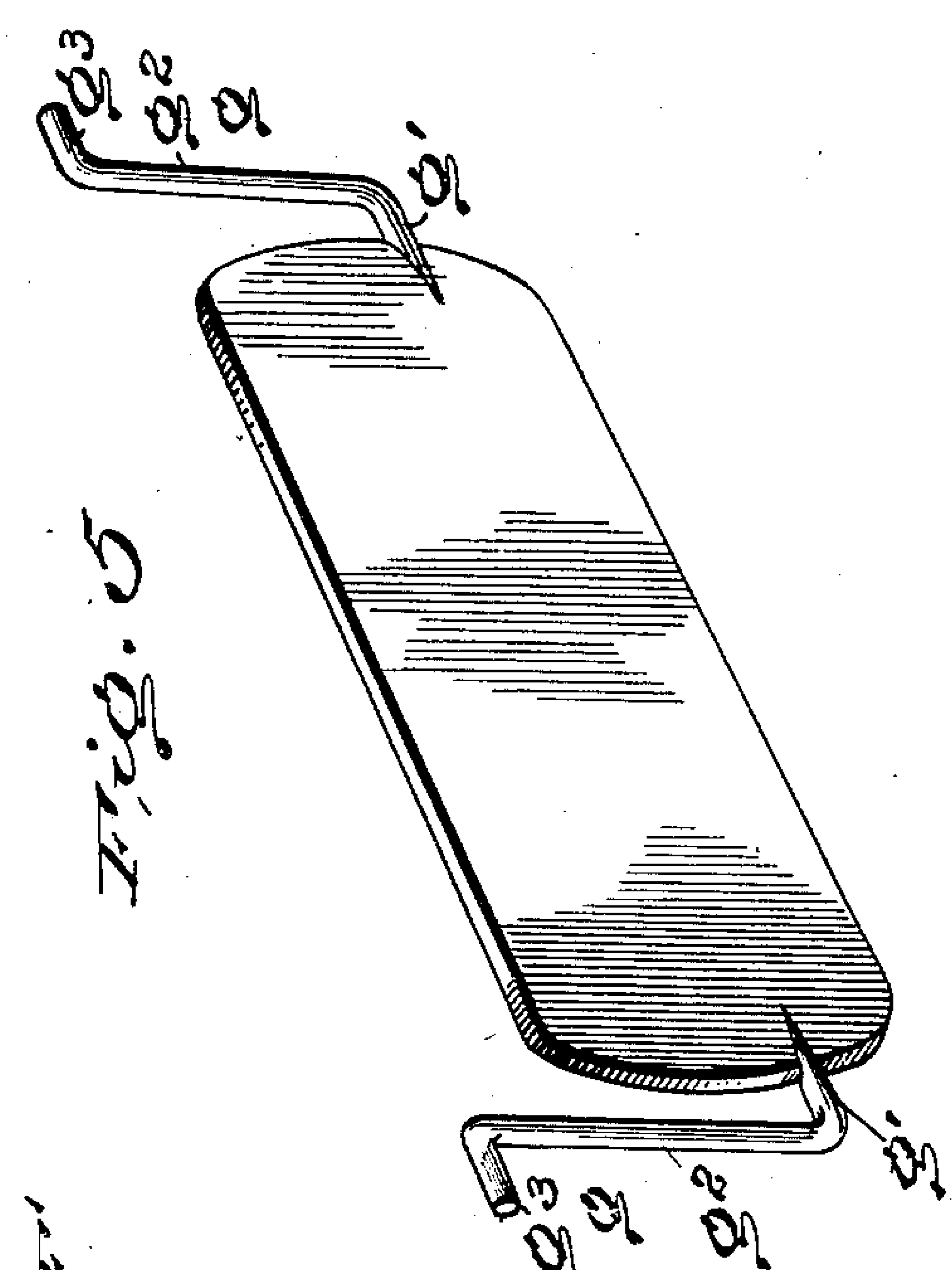

Fig. 5

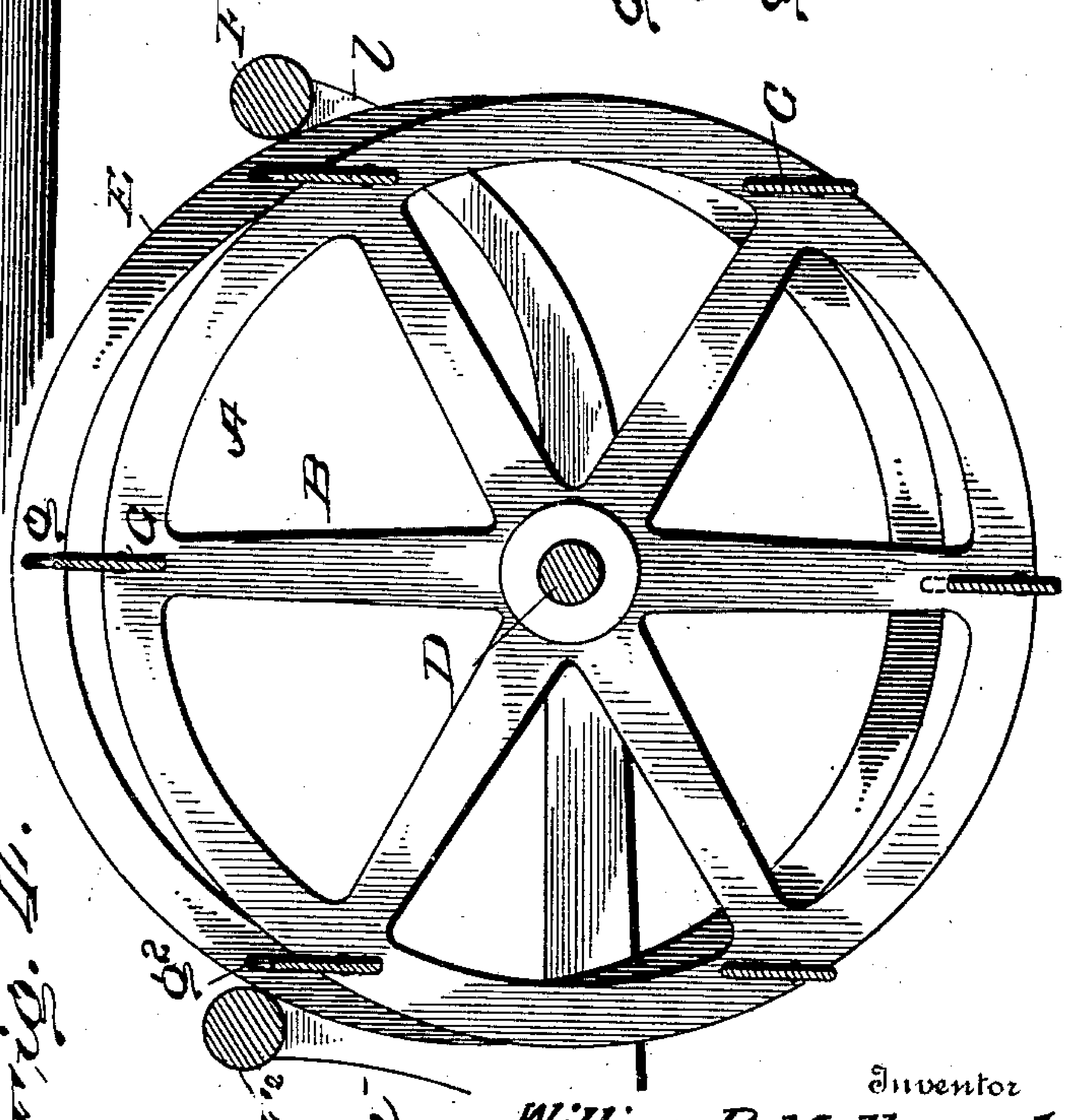

Fig. 4

Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM B. MOTHERAL, OF NORTH McGREGOR, IOWA.

PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 633,529, dated September 19, 1899.

Application filed February 18, 1898. Serial No. 670,831. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. MOTHERAL, a citizen of the United States, residing at North McGregor, in the county of Clayton and State of Iowa, have invented certain new and useful Improvements in Paddle-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in paddle-wheels of that class in which cam-rims are employed to maintain the paddles or floats at all times in vertical position, so as to cause them to enter and leave the water edgewise to avoid concussion and lifting. Heretofore more or less difficulty has been experienced in wheels of this class on account of dragging and shifting of the cam-rims by which the paddles are shifted out of vertical position and caused to enter the water at an angle. This is primarily due to the fact that in wheels of this class heretofore constructed the paddles have been mounted upon the cranks centrally or in line with their lower edges, so that the resistance of the water is transmitted by the cranks and thrown wholly upon the wrists thereof, which have bearing in the cam-rims, thereby throwing all the strain on said rims and retarding the revolution of the same by which the paddles are thrown out of direct vertical position.

The object of this invention, therefore, is to provide a simple and effective construction of wheel in which the paddles are mounted on the cranks between the center and lower edge thereof, whereby the strain is transmitted to the rims of the wheel proper and back pressure on the wrist of the cranks reduced to the minimum and dragging of the cam-rims avoided.

To this end my invention consists in certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and specifically set forth in the appended claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a perspective view of a paddle-wheel constructed in accordance with my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation showing the wheel in use as a stern propeller. Fig. 4 is a central transverse section of same. Fig. 5 is a perspective view of one of the paddles.

Like letters of reference designate corresponding parts throughout the several figures of the drawings.

A A′ represent the rims of the wheel proper, provided with the radial arms B, secured to or formed integrally with the hubs or bosses *c*, keyed or otherwise rigidly secured to the shaft D.

E E′ represent the cam-rims, arranged on the outer side of the wheel-rims proper and eccentrically with relation to the shaft D. When the wheel is employed as a side propeller, rollers F, mounted in bearings transversely of the wheel box or housing, are provided to bear upon the peripheries of the cam-rims and hold the same constantly in an eccentric position; but when the wheel is employed as a stern propeller suitable brackets carrying friction sheaves or rollers are provided for this purpose, as hereinafter described.

G represents the paddles, arranged between the wheel-rims A A′ and pivoted thereto and to the cam-rims by cranks *g*, which are constructed and arranged in a novel manner. Each crank is approximately of **Z** form, having an inwardly-projecting arm *g′* projecting through an opening in the wheel-rim and secured to the paddle, a crank portion g^2, and an outwardly-projecting wrist g^3, mounted in the cam-rim, as shown. The said journal-arms *g′* are connected to the paddles between the lower edge of said paddles and the centers thereof. By this construction it will be seen that the paddles are allowed to rotate freely and that they are constantly maintained in a vertical position as the wheel revolves by the cam-rims E E′, and it will also be seen that owing to this manner of mounting back pressure on the wrists of the cranks is avoided and that therefore the cam-rims will move in fixed relation to the wheel and maintain the paddles at all times in vertical position. The paddles also are strengthened and are not liable to be broken or bent out of place when encountering logs or other obstructions.

In Fig. 3 I have shown my improved pro-

peller-wheel in use as a stern wheel. In this construction the shaft D is mounted to rotate in bearing-brackets H, projecting from the stern of a vessel I and supported by braces K. Each bearing-bracket is provided with an upwardly-curved outer end *l*, carrying a sheave or friction-roller F′, which bears upon the periphery of the cam-rim at the rear of the wheel, and at its inner end with a vertical arm *n*′, carrying a sheave or roller F^2, bearing upon the diametrically opposite side of the periphery of the cam-rim at the front of the wheel. The cam-rims are thereby supported and held eccentric to shaft D. The shaft D may be driven from the engine of the vessel by suitable connection. In the present instance the shaft is shown connected to a connecting-rod *o* by means of a crank *t*.

It will be understood that changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. In a wheel-propeller, spaced rims forming paddle-supports, paddles journaled at their ends to the said supports at points intermediate of their lower edges and centers, crank-arms at the outer ends of the paddle-journals and extending upward toward the upper edges of the paddles and located in the plane thereof and having outer wrists at their upper or free ends, rims exterior to the paddle-supports and having the wrists of the crank-arms journaled thereto and supported solely thereby, and means for maintaining the rims in transverse alinement and in eccentric relation with reference to the paddle-supports, substantially as set forth.

2. In a wheel-propeller, rims forming paddle-supports, paddles journaled at their ends to the said supports at points intermediate of their lower edges and centers, crank-arms at the outer ends of the paddle-journals and extending upward toward the upper edges of the paddles and having outer wrists at their upper ends, rims arranged exterior to the paddle-supports and having the wrists of the crank-arms journaled thereto, brackets having their outer ends curved and provided at their inner ends with vertical arms, rollers journaled to the vertical arms and the curved terminals of the brackets bearing against the front portion of the periphery of the rims to hold the same in relative position, and a drive-shaft journaled to the brackets and having the paddle-supports applied thereto, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM B. MOTHERAL.

Witnesses:
C. C. HINES,
GLADYS L. THOMPSON.